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United States
Department of
Agriculture

Soil
Conservation
Service

Montana
Agricultural
Experiment
Station

Bozeman,
Montana

MONTANA WATER SUPPLY OUTLOOK

Snowpack and Streamflow
Forecasts as of
June 1, 1984

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

SNOW SURVEY UNIT

Federal Bldg., Rm. 443

10 East Babcock

Bozeman, MT 59715

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Late season snowpack variable

Weather during the last half of May was generally cooler than normal. Temperatures did warm for a few days near the end of the month but did not persist. These temperatures resulted in generally below average melt.

Presently, high elevation snowpack is near or above average in southwest Montana, in the Crazy Mountains, Mission Mountains, Swan Range and part of the Kootenai and Lower Clark Fork drainages near Idaho. Snowpack in the mountains near Red Lodge is also above average.

All other areas have below average snowpack for this time of year. Low elevation and most mid-elevation snow has melted.

Remaining snowpacks are isothermal (all of the snowpack is 32°F or 0°C) and daily melt is a function of daily air temperatures.

Soils under the snow or in areas having had snow recently are saturated. Other soils are drying. Many low elevation soils in northern Montana are quite dry for this time of year.

Precipitation and tempera- tures affecting streamflow

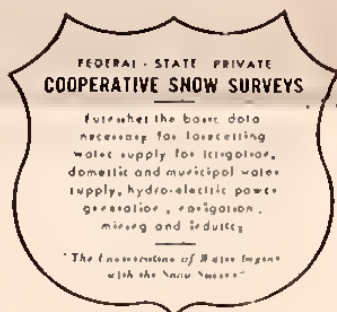
April and May precipitation has been near to above average at most locations west of the Divide and in southwest Montana. Areas east of the Divide in central and north-central Montana have received below average moisture so far this spring. This is about the same general area that had well below average snowpack this winter.

Snow pillow data indicates most streams in the state have already peaked or are in the process of reaching their seasonal snowmelt peak. Streams with higher elevation headwaters such as the Yellowstone River and most of its tributaries above the Bighorn and the Gallatin Rivers should reach their snowmelt peak around mid-June or soon after.

Streamflows have been quite variable this spring increasing with snowmelt water caused by warm temperatures and rain, and then decreasing with cooler weather. This has generally extended the runoff period and will help provide late season water supplies in areas that still have a snowpack.

The Montana Water Supply Outlook is a publication of the U.S. Soil Conservation Service. The SCS administers the Cooperative Snow Survey Program in cooperation with other federal, state and private agencies, organizations, and individuals.

The report is prepared by SCS, Snow Survey and Water Supply Forecast Staff, Room 443, Federal Building, 10 East Babcock, Bozeman, Montana.

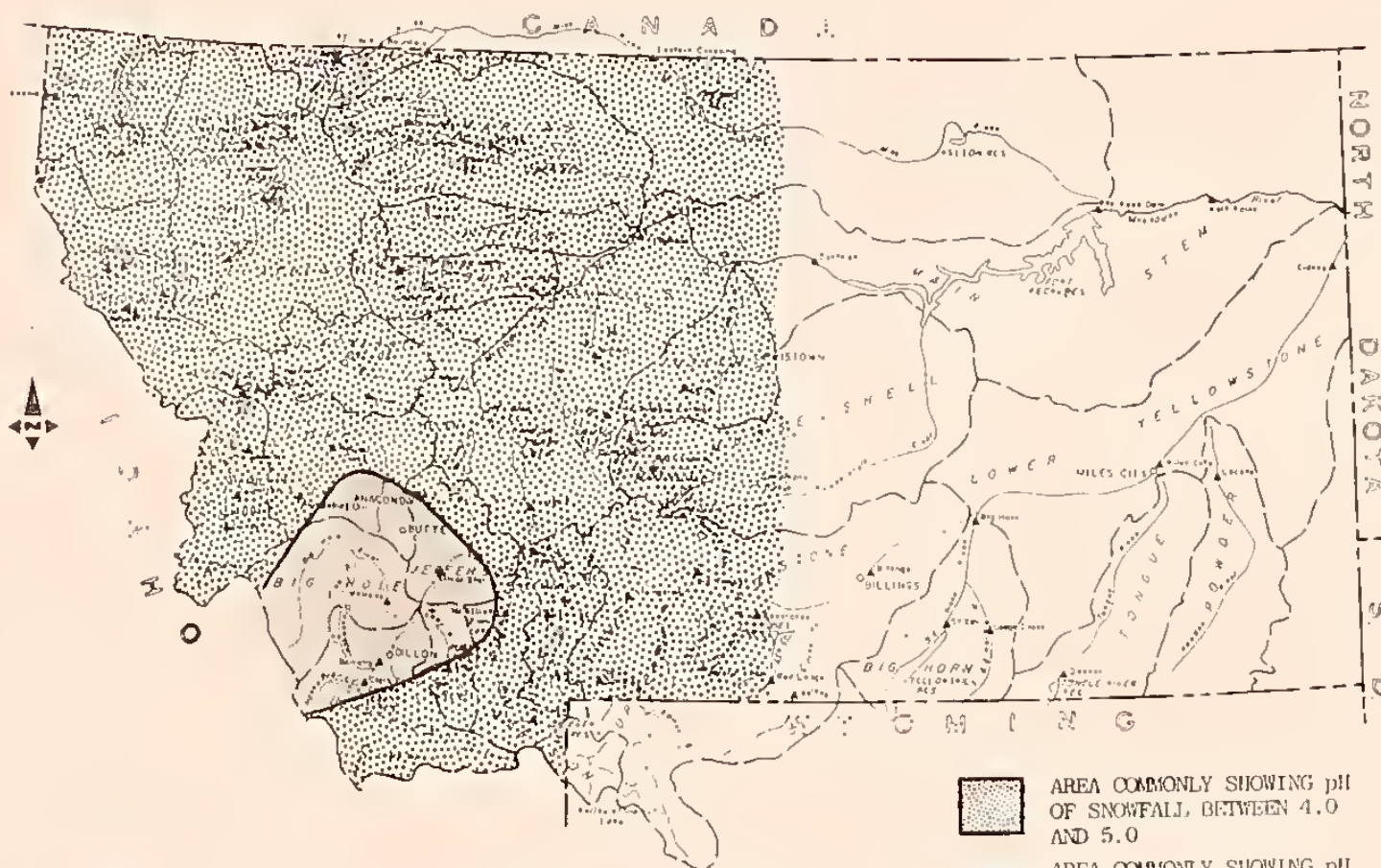


Snowfall pH study

Snow pH measurements were made again this season in conjunction with field snow surveys.

The preliminary results indicate the snowfall in the southwest corner has lower pH than other areas. This is similar to the previous 3 years except the area showing the lower pH readings is somewhat smaller than in previous years.

There were a few low pH readings obtained this season in the vicinity of Kalispell but not enough to separate out a specific area.



SNOWFALL pH STUDY
Winter 1983-84
SCS Snow Surveys
Bozeman, Montana

SNOW SURVEY DATA

SNOW June 1, 1984						
DRAINAGE BASIN and/or SNOW COURSE						
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Last Year	Average
BADGER PASS	6900	5/30	52	24.7A	18.6	36.4
BADGER PASS PILLOW	6900	6/01	SP	18.8	14.5	23.6
BANFIELD MOUNTAIN	5600	5/29	0	.0	12.0	6.4
BANFIELD MOUNTAIN PILLOW	5600	5/29	SP	.6	9.9	3.4
BARKER LAKES PILLOW	8250	6/01	SP	10.9	15.2	11.2
BASIN CREEK PILLOW	7180	6/01	SP	5.8	6.6	6.0
BEAGLE SPRINGS PILLOW	8850	6/01	SP	.0	.0	1.4
BEAR PAW SKI AREA	5200	5/31	0	.0	0.0	0.7
BEAVER LAKE	5900	5/30	13	5.5		
BIG CREEK	7650	6/01	85	41.9	44.8	44.7
BLACK BEAR PILLOW	7950	6/01	SP	26.7	29.9	25.9
BLACK PINE	7100	5/29	7	2.8	7.0	4.4
BLACK PINE PILLOW	7100	6/01	SP	.0	7.4	4.0
BLOODY DICK PILLOW	7550	6/01	SP	.0	.0	1.4
BLUE LAKE	5900	5/30	0	.0A	.0	10.5
BOULDER MOUNTAIN PILLOW	7950	6/01	SP	12.0	13.7	15.0
BOX CANYON PILLOW	6700	6/01	SP	.0	.0	0.0
BOXELDER CREEK	5100	5/31	0	.0	0.0	
BRIDGER BOWL	7250	5/30	49	23.6	18.4	21.9
BRIDGER BOWL PILLOW	7250	5/30	SP	21.4	16.5	17.9
CALVERT CREEK PILLOW	6430	6/01	SP	.0	.0	0.0
CARROT BASIN PILLOW	9000	6/01	SP	28.7	28.6	27.9
CASHE CREEK PILLOW	7800	6/01	SP	1.8	2.0	1.9
CHICKEN CREEK	4060	5/30	0	.0	.0	0.0
CLOVER MEADOW PILLOW	8800	6/01	SP	15.3	10.8	12.2
COLE CREEK PILLOW	7850	6/01	SP	16.7	27.2	13.8
COMBINATION	5600	5/29	0	0.0	.0	0.5
COMBINATION PILLOW	5600	6/01	SP	.0	.2	0.0
COPPER BOTTOM PILLOW	5200	6/01	SP	.0	.0	0.0
COPPER CAMP PILLOW	6950	6/01	SP	7.0	10.2	17.1
CRYSTAL LAKE PILLOW	6050	6/01	SP	.0	.0	1.5
DALY CREEK PILLOW	5780	6/01	SP	.0	.0	0.0
DARKHORSE LAKE PILLOW	8700	6/01	SP	23.9	18.7	27.8
DEADMAN CREEK	6450	5/29	0	0.0	.0	0.5
DEADMAN CREEK PILLOW	6450	6/01	SP	.0	.0	0.8
DESERT MOUNTAIN	5600	5/29	0	.0	2.0	1.4
DIVIDE PILLOW	7800	6/01	SP	3.4	.9	2.1
DIX HILL	6400	5/31	0	.0	.0	0.6
DUPUYER CREEK PILLOW	5750	6/01	SP	.0	.0	
EMERY CREEK	4350	5/29	0	.0	.0	0.3
EMERY CREEK PILLOW	4350	6/01	SP	.0	.0	0.0
FATTY CREEK	5500	6/01	0	.0	8.0	8.7
FISHER CREEK PILLOW	9100	6/01	SP	28.9	28.0	34.6
FLATTOP MOUNTAIN PILLOW	6300	6/01	SP	31.2	33.5	41.6
FOURTH OF JULY	3450	5/29	0	.0	.0	0.0
FRIDAY HILL	4620	5/29	0	.0	.0	0.0
FROHNER MEADOWS PILLOW	6480	6/01	SP	.0	.0	1.9
GARVER CREEK	4250	5/29	0	.0	.0	0.0
GARVER CREEK PILLOW	4250	5/29	SP	.0	.0	0.0
GIBBONS PASS	7100	5/30	27	13.8	8.6	10.2
GRAVE CREEK	4300	5/29	0	.0	.0	1.8

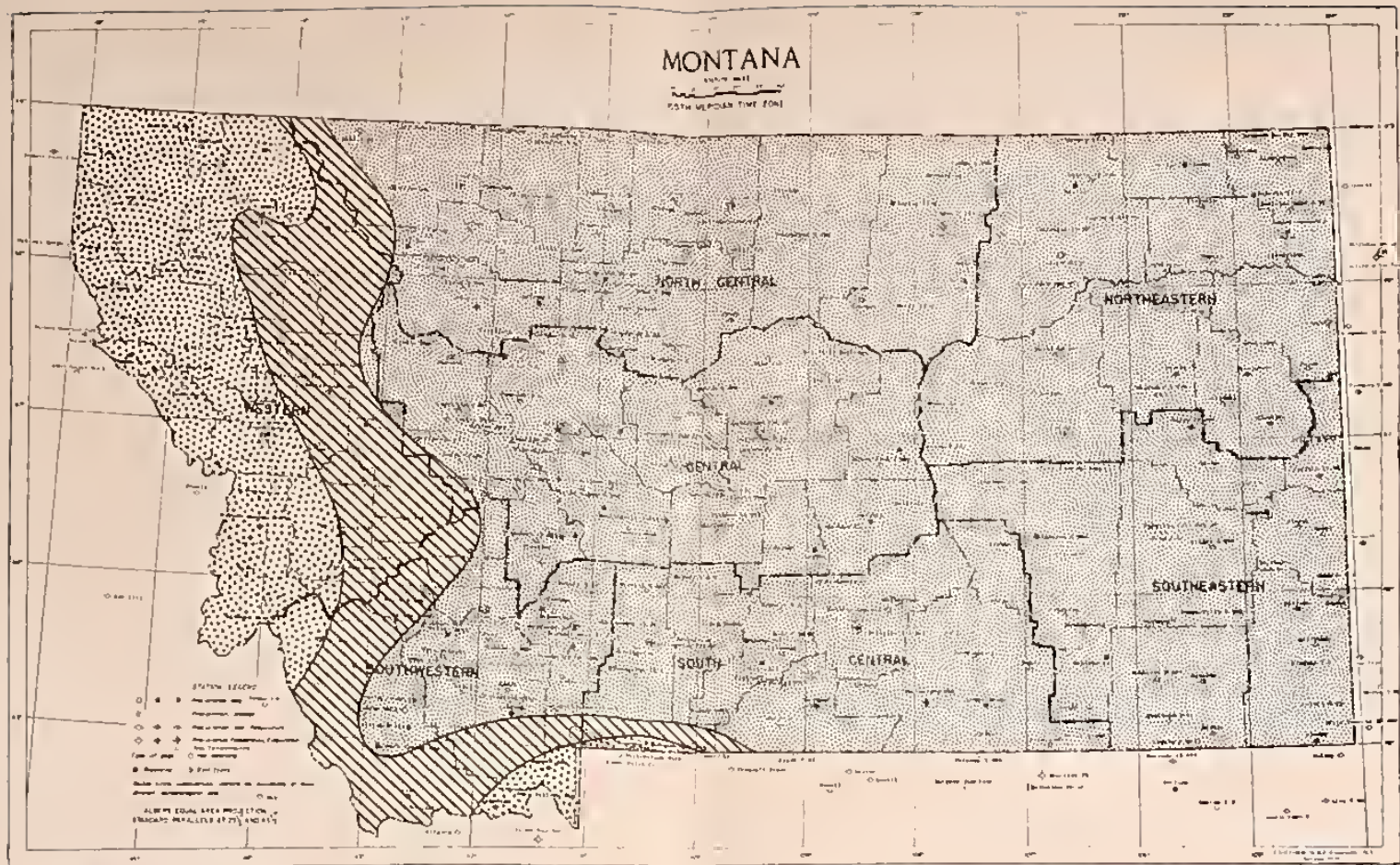
SNOW June 1, 1984						
DRAINAGE BASIN and/or SNOW COURSE						
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Last Year	Average
GRAVE CREEK PILLOW	4300	6/01	SP	.0	.0	0.0
GUNSIGHT LAKE	6300	5/30	52	26.8	19.4	30.0
HAND CREEK PILLOW	5030	6/01	SP	.0	.0	0.0
HAWKINS LAKE	6450	5/29	55	23.6	28.0	21.5
HAWKINS LAKE PILLOW	6450	5/29	SP	22.8	27.0	22.5
HEART LAKE TRAIL	4800	6/01	0	.0	.0	3.1
HELL ROARING DIVIDE	5770	5/31	37	16.7	11.2	12.9
HERRIG JUNCTION	4850	5/30	2	.6	.0	2.6
HOOD MEADOW	6600	5/29	2	.6	3.8	2.9
HOODOO BASIN	6050	6/01	71	35.8	29.9	36.3
HOODOO BASIN PILLOW	6050	6/01	SP	31.0	27.5	29.1
HOODOO CREEK	5900	6/01	66	31.6	27.6	35.6
KINGS HILL	7500	5/29	20	8.4	7.6	10.4
KIWANIS CAMP	3720	5/31	0	.0	0.0	0.2
KRAFT CREEK PILLOW	4750	6/01	SP	.0	.0	0.0
LAKEVIEW RIDGE PILLOW	7400	6/01	SP	.0	.0	0.0
LEWIS RIDGE PILLOW	8100	6/01	SP	2.6	.0	1.8
LICK CREEK	6860	5/29	6	2.4	2.4	1.4
LICK CREEK PILLOW	6860	6/01	SP	.0	.2	0.5
LOWER TWIN PILLOW	7900	6/01	SP	18.4	20.0	18.6
LUBRECHT FLUME	4680	5/31	0	.0		
LUBRECHT FLUME PILLOW	4680	6/01	SP	.0	.0	0.0
LUBRECHT FOREST # 3	5450	5/31	0	.0		
LUBRECHT FOREST # 4	4650	5/31	0	.0		
LUBRECHT FOREST # 5	4040	5/31	0	.0		
LUBRECHT HYDROPLT	4200	5/31	0	.0		
MANY GLACIER	4900	5/29	0	.0		
MANY GLACIER PILLOW	4900	6/01	SP	.0	.0	0.0
MAYNARD CREEK	6210	5/30	2	.6	.0	4.7
MAYNARD CREEK PILLOW	6210	5/30	SP	5.2	4.0	4.7
MOHAWK PEAK PILLOW	8850	6/01	SP	15.6	15.9	23.9
MOUNT LOCKHART PILLOW	6400	6/01	SP	4.7	7.3	12.6
MULE CREEK PILLOW	8350	6/01	SP	9.8	9.7	12.3
NEVADA CREEK PILLOW	6480	6/01	SP	.0	2.9	5.8
NEWTOWN MOUNTAIN	5600	5/29	54	23.9	27.1	13.6
NEZ PERCE CAMP PILLOW	5650	6/01	SP	.0	.0	0.4
NOISY BASIN	6040	5/29	106	54.8	44.7	43.6
NOISY BASIN PILLOW	6040	6/01	SP	48.4	35.6	30.0
NORTH FK. ELK CREEK	6250	5/31	0	.0	0.0	2.5
NORTH FK. ELK CREEK PILLOW	6250	6/01	SP	.0	.0	1.1
NORTH FORK JCKO	6330	6/01	58	29.0	25.2	29.5
NORTHEAST ENTRANCE	7350	5/27	0	.0	.0	0.6
NORTHEAST ENTRANCE PILLOW	7350	6/01	SP	.0	.0	0.0
OPHIR PARK	7150	5/31	20	8.1		8.9
PETERSON MEADOWS	7200	6/04	8	2.4	.0	1.8
PETERSON MEADOWS PILLOW	7200	6/04	SP	4.8	.9	3.7
PICKFOOT CREEK PILLOW	6650	6/01	SP	.0	.0	0.0
PIKE CREEK	5930	5/30	9	3.6	11.6	
PIKE CREEK PILLOW	5930	6/01	SP	.9	9.8	13.2
PLACER BASIN PILLOW	8830	6/01	SP	20.5	17.6	21.0
POORMAN CREEK	5100	5/29	25	11.3	12.1	10.2
POORMAN CREEK PILLOW	5100	5/29	SP	10.1	6.6	10.6
PORCUPINE PILLOW	6500	6/01	SP	.0	.0	0.2
RED MOUNTAIN	6000	6/01	8	3.7	.0	5.2
RED TOP	5260	5/29	32	13.8	16.6	6.4
ROCKER PEAK	8000	5/31	17	6.8	4.5	10.6
ROCKER PEAK PILLOW	8000	6/01	SP	10.3	13.2	15.2
ROCKY BOY	4700	5/31	0	.0	0.0	0.6
ROCKY BOY PILLOW	4700	5/31	SP	.0	0.0	0.3
SADDLE MOUNTAIN PILLOW	7900	6/01	SP	17.1	18.3	20.1
SHOWER FALLS PILLOW	8100	6/01	SP	29.2	25.3	23.9

SNOW June 1, 1984						
DRAINAGE BASIN and/or SNOW COURSE						
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Last Year	Average
SILVER RUN PILLOW	6630	6/01	SP	.0	.0	0.0
SKALKAHO SUMMIT	7250	5/29	34	14.3	19.4	15.4
SKALKAHO SUMMIT PILLOW	7250	6/01	SP	15.5	16.0	18.7
SKYLARK TRAIL PILLOW	6200	6/01	SP	16.1	10.8	20.6
SOUTH FORK SHIELDS PILLOW	7000	6/01	SP	24.1	16.2	14.3
SPOTTED BEAR MOUNTAIN	7000	5/30	0	.0A	0.0	0.7
SPUR PARK	8100	5/29	37	16.2	16.4	18.2
SPUR PARK PILLOW	8100	6/01	SP	13.8	18.6	17.3
STAHL PEAK	6030	5/29	75	35.8	38.6	33.0
STAHL PEAK PILLOW	6030	6/01	SP	31.5	33.1	27.2
STRYKER BASIN	6180	5/30	52	24.3	21.5	19.5
STUART MOUNTAIN	7000	6/01	55	26.0	23.0	20.9
SUCKER CREEK	3960	5/31	0	.0	.0	0.1
TAYLOR ROAD	4080	5/31	0	.0	.0	0.2
TEPEE CREEK PILLOW	8000	6/01	SP	5.0	8.2	5.7
TRINKUS LAKE	6100	5/30	61	30.4	21.4	26.4
TV MOUNTAIN	6800	6/01	26	11.5	7.3	10.3
TWELVENILE CREEK PILLOW	5600	6/01	SP	.0	.0	0.7
TWIN CREEKS	3580	5/30	0	.0A	0.0	0.0
TWIN LAKES PILLOW	6400	6/01	SP	28.2	18.9	28.9
UPPER HOLLAND LAKE	6200	6/01	41	20.0	15.0	21.5
WALDRON PILLOW	5600	6/01	SP	.0	.0	0.2
WARM SPRINGS PILLOW	7800	6/01	SP	21.0	18.7	24.3
WEASEL DIVIDE	5450	5/29	39	18.6	23.2	19.7
WEST YELLOWSTONE PILLOW	6700	5/31	SP	.0	0.0	0.0
WHISKEY CREEK PILLOW	6800	6/01	SP	.0	.0	1.5
WHITE MILL PILLOW	8700	6/01	SP	20.3	19.1	19.8
WOOD CREEK PILLOW	5960	6/01	SP	.0	.0	0.0

Unpublished data and corrections to previously published data

MID-JANUARY						
Copper Bottom	5200	1/18	14	4.2	-	-
Hoodoo Basin	6050	1/16	62	21.2	29.7	-
Hoodoo Creek	5900	1/16	58	18.5	27.2	-
Pike Creek	5930	1/19	28	7.6	-	-
Skalkaho Summit	7250	1/17	38	9.4	-	-
FEBRUARY						
Box Canyon	6670	2/07	23	5.4	-	-
Crystal Lake	6050	2/08	32	8.1	-	-
Kiwanis Camp	3720	1/30	7	1.6	0.6	1.9
Monument Peak	8850	2/07	45	13.2	-	-
Ten Mile Upper	8000	1/25	28	6.8	7.6	9.9
West Rosebud	7500	2/01	21	5.3	5.1	7.5

SNOW						
DRAINAGE BASIN and/or SNOW COURSE		THIS YEAR			PAST RECORD	
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Last Year	Average
MID-FEBRUARY						
Hoodoo Basin	6050	2/15	87	29.2	35.5	-
Hoodoo Creek	5900	2/15	82	27.2	33.0	-
MARCH						
Carter Creek	7400	2/29	19	4.8	4.4	3.8
Copper Bottom	5200	2/28	15	5.4	7.7	11.0
Holbrook	4530	3/02	15	4.5	6.4	9.6
MID-MARCH						
Heart Lake Trail	4800	3/15	42	15.8	-	-
Hoodoo Basin	6050	3/15	101	37.6	43.8	-
Hoodoo Creek	5900	3/15	96	34.3	41.2	-
APRIL						
Badger Pass	6900	4/01	73	26.0	29.6	40.4
Blue Lake	5900	4/01	47	15.8	18.9	27.0
Holbrook	4530	3/29	14	4.2	4.8	10.2
Picket Pin D	9450	3/26	66	20.5	22.0	27.5
Spotted Bear Mtn.	7000	4/01	34	11.4	12.4	15.9
Twin Creeks	3580	4/01	13	5.1	5.5	11.6
MID-APRIL						
Basin Creek	7180	4/11	46	11.4	-	-
Cashe Creek	7800	4/17	33	10.6	-	-
Cottonwood Creek	6400	4/10	39	10.5	-	-
Hoodoo Basin	6050	4/16	101	43.3	50.4	-
Hoodoo Creek	5900	4/16	93	38.3	44.5	-
Picket Pin D	9450	4/15	60	21.5A	-	-
Placer Basin F	8830	4/15	54	19.0A	-	-
Warm Springs	7800	4/12	68	21.0	-	-
MID-MAY						
Badger Pass	6900	5/17	65	28.4	32.2	43.5
Blue Lake	5900	5/17	26	12.0	18.7	21.6
Upper Holland Lake	6200	5/18	62	27.4	25.4	32.7



VALLEY PRECIPITATION

MAY 1984

SOURCE: National Weather Service

Great Falls, MT



AGENCIES AND ORGANIZATIONS COOPERATING IN MONTANA SNOW SURVEYS

GOVERNMENT AGENCIES

Canada

- Department of the Environment
 - Atmospheric Environment Service
 - Water Management Service
- British Columbia Ministry of Environment
 - Inventory and Engineering Branch, Hydrology Section
- Alberta Environment
 - Technical Services Division

Federal

- Department of the Army
 - Corps of Engineers
- Department of Agriculture
 - Forest Service
 - Soil Conservation Service
- Department of Commerce
 - National Environmental Satellite Service
- Department of Interior
 - National Weather Service
 - Bureau of Indian Affairs
 - Fish and Wildlife Service
 - Geological Survey
 - National Park Service
 - Bureau of Reclamation
- Department of Energy
 - Bonneville Power Administration

STATE AGENCIES

- Montana Conservation Districts
- Montana Department of Fish, Wildlife and Parks
- Montana Department of Natural Resources and Conservation
- Montana State University - Agricultural Experiment Station
- University of Montana - School of Forestry

PRIVATE ORGANIZATIONS

- The Anaconda Company
- Big Sky of Montana
- Butte Water Company
- Flathead Valley Community College
- Montana Power Company
- Pondera County Canal & Reservoir Company

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

RESERVOIR STORAGE (Thousand Acre Feet) END OF MONTH May 31, 1984

Basin or Stream	RESERVOIR	Usable Capacity	Usable Storage		
			This Year	Last Year	Average
COLUMBIA					
Kootenai	Koocanusa	5,748.2	3,237.0	3,427.0	3,214.0
Flathead	Hungry Horse	3,451.0	2,549.0	2,879.0	2,616.0
	Flathead Lake	1,791.0	1,464.0	1,489.0	1,463.0
Clark Fork	Camas (4)	45.2	32.2	38.4	31.1
	Mission Valley (8)	100.3	81.1	85.0	66.5
	Georgetown Lake	31.0	29.3	26.8	26.2
	Lower Willow Creek	4.9	5.1	5.0	4.3
	Nevada Creek	12.6	12.7	12.9	11.5
	Noxon Rapids	334.6	291.1	328.3	258.3
Bitterroot	Painted Rocks	31.7	---	---	30.1
	Como	34.9	33.0	---	27.1
MISSOURI					
Beaverhead	Lima	84.0	82.6	68.4	64.6
	Clark Canyon	257.2	250.7	180.8	163.7
Ruby	Ruby	38.8	40.9	38.8	37.8
Madison	Hebgen Lake	377.5	337.3	263.4	291.7
	Ennis Lake	41.0	36.9	38.5	35.8
Gallatin	Middle Creek	8.0	6.1	7.2	6.7
Missouri	Canyon Ferry	2,043.0	1,795.0	1,675.0	1,651.0
	Hauser & Helena	61.9	62.5	63.0	60.0
	Helena Valley	10.4	10.7	---	7.6
	Lake Helena	10.4	10.7	10.9	9.8
	Holter Lake	81.9	79.6	80.0	77.3
	Fort Peck Lake	18,910.0	16,390.0	16,200.0	15,750.0
Smith	Smith River	10.6	11.6	11.6	10.6
	Newlan Creek	12.4	10.7	9.6	9.5
Musselshell	Bair	7.0	4.9	7.1	6.6
	Martinsdale	23.1	23.3	21.2	17.2
Sun	Deadman's Basin	72.2	64.8	---	57.2
	Gibson	99.1	96.2	92.3	90.1
	Willow Creek	32.2	30.1	26.2	28.2
	Pishkun	32.0	28.5	30.4	31.7
Marias	Lower Two Medicine	11.9	---	---	12.5
	Four Horns	19.2	---	---	13.1
	Swift	30.0	23.6	28.2	24.9
	Lake Frances	111.9	46.3	89.0	88.3
Milk	Elwell (Tiber)	1,347.0	735.0	772.6	648.4
	Beaver Creek	3.5	3.1	3.1	3.0
	Fresno	127.2	14.8	48.8	96.7
	Nelson	66.8	20.2	46.3	44.1
HUDSON BAY					
St. Mary's	Lake Sherburne	64.3	14.5	22.6	31.9
YELLOWSTONE					
Stillwater	Mystic Lake	21.0	2.7	2.7	5.6
Clark's Fork	Cooney	27.4	22.3	22.1	18.8
Tongue	Tongue River	68.0	43.2	39.1	48.8
Bighorn	Bighorn Lake	1,356.0	946.1	896.5	702.7

